

What is claimed is:

1. A method for synchronously recording and playing back a plurality of video signals generated by a plurality of externally synchronized video transmitters, in a system
5 connecting said video transmitters to a plurality of digital recorders through a first plurality of transmission lines and further connecting said digital recorders to a playback receiver through a second plurality of transmission lines; wherein
said playback receiver includes an external sync generator for generating an external sync signal and said digital recorders include each a circuit for receiving and for transferring
10 said external sync signal to said video transmitters; and
each of said video transmitters includes an identification code generator for mixing each of said video signals with an individually allotted identification code signal and each of said digital recorders has a circuit for processing an externally synchronized signal and at least
15 one memory storage device for a routine storing of processed video signals in an endless rotation, the method, comprising the steps of:
propagating said video signals from said video transmitters to said digital recorders through said first plurality of transmission lines and signals selected from the group consisting of said video signals, said processed video signals, playback video signals and a

combination thereof, from said digital recorders to said playback receiver through said second plurality of transmission lines, and propagating said external sync signal and a retrieval command signal from said playback receiver to said digital recorders through said second plurality of transmission lines and transferring said external sync signal to said video transmitters through said first plurality of transmission lines;

5 extracting identification codes from respective video signals and registering the extracted identification codes for playback retrieval;

10 routinely processing said video signals and storing said processed video signals on the basis of the time and date of said processing into said at least one memory storage device to its capacity, in endless rotation, wherein freshly stored signals replace the oldest stored signals;

15 generating said retrieval command signal on the basis of a selected time and date and at least one of said identification code for accessing said digital video recorders having commensurating registry of said identification code for synchronously retrieving said selected video signals, wherein said retrieval command signal is selected from the group consisting of a command for monitoring said video signals, a command for monitoring said processed video signals, a command for playback of stored processed video signals and a combination command thereof, and wherein said digital recorders reprocess the retrieved video signals and inject signals corresponding to said registered identification codes and

signals corresponding to said selected time and dates into the vertical blanking period of the reprocessed video signals.

2. The method as set forth in claim 1 which for synchronizing said transmitters, further
5 comprises the steps of:

transmitting a pulse signal having a voltage level higher than a maximum voltage level of said video signals or lower than a minimum voltage level of said video signals to a respective transmitter over one of said video transmission lines as an external synchronizing signal by using blanking level portions of the video signals;

- 10 separating said pulse signal transmitted over said transmission line from said video signals by comparing said video signals to a reference signal having a predetermined voltage level; and

applying said separated pulse signal to said transmitter.

- 15 3. The method as set forth in claim 2, wherein said pulse signal is opposite in polarity to an internal synchronizing signal which is contained in each of said video signals.

4. The method as set forth in claim 1, wherein each of said digital recorders further includes at least one exclusive memory device or wherein a portion of said memory storage device

is excluded from said endless rotation for retaining a selected stored processed video signal,
the method comprising the step of :

commanding a respective digital recorder to duplicate and re-store said selected processed
video signal into said at least one exclusive memory device or into said portion of said
5 memory storage device thereby retaining and protecting said selected signals from routine
replacement by said freshly stored signals.

5. The method as set forth in claim 1, wherein each digital recorder further includes an alarm
input for triggering alarm recording and for generating an alarm code for each of the
10 triggered alarms, the method further comprising the steps of:

registering said stored signals processed during each triggered alarm on the basis of each
said alarm code for playback retrieval and for injecting signals corresponding to said alarm
code into said reprocessed video signals along with said identification code and said time
and date.

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6. The method as set forth in claim 5, wherein said digital recorder further includes at least
one exclusive memory device or a portion of said memory storage device is excluded from
said endless rotation for retaining signals processed during said alarms, the method
comprising the steps of:

commanding said digital recorders to duplicate and re-store signals processed during alarms into said at least one exclusive memory device or into said portion of said memory storage device thereby retaining and protecting said signals processed during alarms from routine replacement by said freshly stored signals.

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7. A method as set forth in claim 6, wherein said step of duplicating and re-storing said signals processed during alarms further includes the step of duplicating and re-storing processed signals to include signals processed prior to said triggering of said alarm and after said alarm has been cleared.

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8. The method as set forth in claim 6 and adapted for retrieving said routinely stored signals, the method further comprising the steps of:

retrieving said stored signals from said at least one main memory storage device and said at least one exclusive memory device on the basis of at least one of said registered identification code, said time and date of the routine processing of said stored signals and

of said registered alarm code; and

injecting signals corresponding to at least one of said identification code signals, signals corresponding to the time and date of said processing of said retrieved signals and said signals corresponding to said alarm code into said vertical blanking portion of said

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reprocessed video signals.

9. The method as set forth in claim 1, adapted for simultaneous displaying a plurality of said retrieved and reprocessed video signals from said plurality of digital recorders through said playback receiver further comprising the steps of:

outputting simultaneously a selected plurality of display signals by extracting from said retrieved and reprocessed video signals at least one of said injected time and dates and more than one of said injected identification codes.

10. The method as set forth in claim 8, adapted for simultaneous displaying a plurality of said retrieved and reprocessed video signals from said plurality of digital recorders through said playback receiver, further comprising the steps of:

outputting simultaneously a selected plurality of display signals by extracting from said retrieved and reprocessed video signals at least one of said injected time and dates, more than one of said injected identification codes and at least one of said injected alarm codes.

11. The method as set forth in claim 9, and further comprising the step of:

applying at least one of the extracted identification codes and said time and date for superimposing upon command any of said identification code and said time and date onto a

display.

12. The method as set forth in claim 10, and further comprising the step of;

applying at least one of the extracted identification code, said time and dates and said

5 alarm code for superimposing upon command any of said identification codes, said time
and date and said alarm code onto a display.

13. The method as set forth in claim 11, wherein said playback receiver further includes a

directory memory for storing texts and names on the basis of said identification codes and

10 the method further comprising the steps of:

retrieving text and name from said directory memory on the basis of said identification
code and superimposing upon command a selected said text, name and a combination
thereof onto said display.

15 14. The method as set forth in claim 12, wherein said playback receiver further includes a

directory memory for storing texts and names on the basis of said identification codes and

the method further comprising the step of;

retrieving text and name from said directory memory on the basis of said identification
code and superimposing upon command said selected text, name and a combination

thereof onto said display.

15. The method as set forth in claim 9, and further comprising the steps of:

combining a plurality of said retrieved reprocessed signals on the basis of said time and
5 dates and on the basis of plurality of said identification codes for displaying on command a
split picture and multi-screen picture selected from the group consisting of picture in
picture, quad picture, 9 split picture, 16 split picture and a combination thereof.

16. The method as set forth in claim 10, and further comprising the steps of:

10 combining a plurality of said retrieved reprocessed signals on the basis of said time and
dates and on the basis of plurality of said identification codes for displaying on command a
split picture and multi-screen picture selected from the group consisting of picture in
picture, quad picture, 9 split picture, 16 split picture and a combination thereof.

15 17. A method for time base corrected recording and synchronously playing back a plurality of
video signals generated by plurality of non externally synchronized video transmitters, in a
system connecting said video transmitters to a plurality of digital recorders through a first
plurality of transmission lines and further connecting said digital recorders to a playback
receiver through a second plurality of transmission lines; wherein

said playback receiver includes an external sync generator for generating an external sync signal and said digital recorders include each a circuit for applying said external sync signal to a signal processing circuit and to a time base correcting circuit,

each said digital recorder includes said time base correcting circuit for correcting the
5 synchronizing signals portion of said video signal, said signal processing circuit, an identification code generator for registering an individually allotted identification code to each of said digital recorders and for generating identification code signals, and at least one memory storage device for routine storing of processed video signals in endless rotation, according to the present invention, the method comprising the steps of:

10 propagating said video signals from said video transmitters to said digital recorders through said first plurality of transmission lines and signals selected from the group consisting of said time base corrected video signals, said processed video signals, playback video signals and a combination thereof, from said digital recorders to said playback receiver through said second plurality of transmission lines, and propagating said external
15 sync signal and a retrieval command signal from said playback receiver to said digital recorders through said second plurality of transmission lines;

routinely processing said video signals and storing processed video signals on the basis of the time and date of said processing into said at least one memory storage device to its capacity, in an endless rotation, wherein freshly stored signals replace the oldest stored

signals;

generating said retrieval command signals on the basis of a selected time and date and at least one said identification code for accessing said digital video recorders having commensurating registry of said identification codes for synchronously retrieving said selected video signals, wherein said retrieval command is selected from the group consisting of a command for monitoring said time base corrected video signal, a command for monitoring said processed video signal, a command for playback of stored processed video signal and a combination thereof and wherein said digital recorders reprocess the retrieved video signals and inject said identification code signals and a signal corresponding to said selected time and dates into the vertical blanking period of the processed video signals.

18. The method as set forth in claim 17, which for synchronizing said digital video recorder, further comprises the steps of:

transmitting a pulse signal having a voltage level higher than a maximum voltage level of said video signals or lower than a minimum voltage level of said video signals to respective digital video recorders over a transmission line of said second plurality of transmission lines as an external synchronizing signal by using blanking level portions of the video signals;

separating said pulse signal transmitted over said transmission line from said video signals
by comparing said video signals to a reference signal having a predetermined voltage level;
and
applying said separated pulse signal to said digital video recorder.

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19. The method as set forth in claim 18, wherein said pulse signal is opposite in polarity to an
internal synchronizing signal which is contained in each of said video signals.

20. The method as set forth in claim 17, for synchronizing said digital video recorder

10 comprising the steps of:

transmitting an external synchronizing signal selected from one of horizontal and vertical
drive signal, or vertical drive signal, or composite signal, or horizontal and vertical signal
over a transmission line; and

applying said external synchronizing signal to respective time base correctors and to said

15 signal processing circuits.

21. The method as set forth in claim 17, wherein said digital recorder further includes at least
one exclusive memory device or a portion of said memory storage device is excluded from
said endless rotation for retaining a selected stored processed video signal, the method

further comprising the steps of;

commanding said digital recorder to duplicate and re-store said selected processed video signal into said at least one exclusive memory device or into said portion of said memory storage device thereby retaining and protecting said selected signals from routine replacement by said freshly stored signals.

22. The method as set forth in claim 17, wherein said digital recorder further includes an alarm input for triggering alarm recording and for generating alarm code for each of the triggered alarms. the method further comprising the steps of;

registering said stored signals processed during each triggered alarm on the basis of each said alarm code for playback retrieval and for injecting signals corresponding to said alarm code into said reprocessed video signal along with said identification code and said time and date.

23. The method as set forth in claim 22, wherein said digital recorder further includes at least one exclusive memory device or a portion of said memory storage device is excluded from said endless rotation for retaining signals processed during said alarms, the method further comprising the steps of:

commanding said digital recorders to duplicate and re-store signals processed during alarms into said at least one exclusive memory device or into said portion of said memory storage device thereby retaining and protecting said signals processed during alarms from routine replacement by said freshly stored signals.

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24. The method as set forth in claim 23, wherein said step of duplicating and re-storing said signals processed during alarms further includes the step of duplicating and re-storing processed signals to include signals processed prior to said triggering of said alarm and after said alarm has been cleared.

10 25. The method as set forth in claim 22, and adapted for retrieving said routinely stored signals, the method further comprising the steps of:

retrieving said stored signals from said at least one main memory storage device and said at least one exclusive memory device on the basis of at least one of said registered identification code, said time and date of the routine processing of said stored signals and
15 of said registered alarm code; and

injecting signals corresponding to at least one of said identification code signals, signals corresponding to the time and date of said processing of said retrieved signals and said signals corresponding to said alarm code into said vertical blanking portion of said reprocessed video signals.

26. The method as set forth in claim 17, adapted for simultaneous displaying a plurality of said retrieved and reprocessed video signals from said plurality of digital recorders through said playback receiver, the method further comprising the steps of:

5 outputting simultaneously a selected plurality of display signals by extracting from said retrieved and reprocessed video signals at least one of said injected time and dates and more than one of said injected identification codes.

27. The method as set forth in claim 25, adapted for simultaneous displaying a plurality of said
10 retrieved and reprocessed video signals from said plurality of digital recorders through said playback receiver and further comprising the step of:

outputting simultaneously a selected plurality of display signals by extracting from said retrieved and reprocessed video signals at least one of said injected time and dates, more than one of said injected identification codes and at least one of said injected alarm codes.

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28. The method as set forth in claim 26, and further comprising the step of;
applying at least one of the extracted identification code and said time and date for
superimposing upon command any of said identification code and said time and date onto a
display.

29. The method as set forth in claim 27, and further comprising the step of:

applying at least one of the extracted identification code, said time and date and said alarm
code for superimposing upon command any of said identification code, said time and date
5 and said alarm code onto a display.

30. The method as set forth in claim 28, wherein said playback receiver further includes a
directory memory for storing texts and names on the basis of said identification codes and
the method further comprising the steps of;

10 retrieving text and name from said directory memory on the basis of said identification
code and superimposing upon command a selected said text, name and a combination
thereof onto said display.

31. The method as set forth in claim 29, wherein said playback receiver further includes a
15 directory memory for storing texts and names on the basis of said identification codes and
the method further comprises the steps of:

retrieving text and name from said directory memory on the basis of said identification
code and superimposing upon command said selected text, name and a combination
thereof onto said display.

32. The method as set forth in claim 26, and further comprising the step of:

combining a plurality of said retrieved reprocessed signals on the basis of said time and
dates and on the basis of plurality of said identification codes for displaying on command a
5 split picture and multi-screen picture selected from the group consisting of picture in
picture, quad picture, 9 split picture, 16 split picture and a combination thereof.

33. The method as set forth in claim 27, and further comprising the step of;

combining a plurality of said retrieved reprocessed signals on the basis of said time and
10 dates and on the basis of plurality of said identification codes for displaying on command a
split picture and multi-screen picture selected from the group consisting of picture in
picture, quad picture, 9 split picture, 16 split picture and a combination thereof.

34. A method for non-externally synchronized recording and synchronously playing back a

15 plurality of video signals generated by a plurality of non externally synchronized video
transmitters, in a system connecting said video transmitters to a plurality of digital
recorders through a first plurality of transmission lines and further connecting said digital
recorders to a playback receiver through a second plurality of transmission lines; wherein
said playback receiver includes an external sync generator for generating external sync

signal and said digital recorders include each an external synchronizing receiving circuit for applying said external sync signal to a signal processing circuit; and

each said digital video recorder includes an identification code generator for registering an individually allotted identification code to each said digital recorder and for generating

5 identification code signals, an externally synchronized said signal processing circuit and at least one memory storage device for routine storing of processed video signals in endless rotation, according to the present invention, the method comprising the steps of:

propagating said video signals from said video transmitters to said digital recorders through said first plurality of transmission lines and signals selected from the group

10 consisting of said video signals, said processed video signals, playback video signals and a combination thereof, from said digital recorders to said playback receiver through said second plurality of transmission lines, and propagating said external sync signal and a retrieval command signal from said playback receiver to said digital recorders through said second plurality of transmission lines;

15 routinely processing said video signals and storing a processed video signals on the basis of the time and date of said processing into said at least one memory storage devices to its capacity, in endless rotation, wherein freshly stored signals replaces the oldest stored signals;

generating said retrieval command signals on the basis of a selected time and date and at

least one said identification code for accessing said digital video recorders having
commensurating registry of said identification codes for synchronously retrieving said
selected video signals, wherein said retrieval command is selected from a group consisting
of a command for monitoring said video signal, a command for monitoring said processed
5 video signal, a command for playback of stored processed video signal and a combination
command thereof and wherein said digital recorders reprocess the retrieved video signals
and inject said identification code signals and signals corresponding to said selected time
and dates into the vertical blanking period of the reprocessed video signals.

- 10 35. The method as set forth in claim 34, which for synchronizing said digital video recorder,
further comprises the steps of;

transmitting a pulse signal having a voltage level higher than a maximum voltage level of
said video signals or lower than a minimum voltage level of said video signals to
respective digital video recorders over a transmission line of said second plurality of
15 transmission lines as an external synchronizing signal by using blanking level portions of
the video signals;

separating said pulse signal transmitted over said transmission line from said video signals
by comparing said video signals to a reference signal having a predetermined voltage level;

and

applying said separated pulse signal to said digital video recorder.

36. The method as set forth in claim 35, wherein said pulse signal is opposite in polarity to an internal synchronizing signal which is contained in each of said video signals.

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37. The method as set forth in claim 34, for synchronizing said digital video recorder comprises the steps of:

transmitting an external synchronizing signal selected from one of horizontal and vertical drive signal, or vertical drive signal, or composite signal, or horizontal and vertical signal

10 over a transmission line; and

applying said external synchronizing signal to respective said signal processing circuit.

38. The method as set forth in claim 34, wherein said digital recorder further includes at least one exclusive memory device or a portion of said memory storage device is excluded from

15 said endless rotation for retaining a selected stored processed video signal, the method further comprising the step of;

commanding said digital recorder to duplicate and re-store said selected processed video signal into said at least one exclusive memory device or into said portion of said memory

storage device thereby retaining and protecting said selected signals from routine

replacement by said freshly stored signals.

39. The method as set forth in claim 34, wherein said digital recorder further includes an alarm input for triggering alarm recording and for generating an alarm code for each of the triggered alarms, the method further comprising the step of;
- 5 registering said stored signals processed during each triggered alarm on the basis of each said alarm code for playback retrieval and for injecting signals corresponding to said alarm code into said reprocessed video signal along with said identification code and said time and date.

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40. The method as set forth in claim 39, wherein said digital recorder further includes at least one exclusive memory device or a portion of said memory storage device is excluded from said endless rotation for retaining signals processed during said alarms, the method comprising the step of;
- 15 commanding said digital recorders to duplicate and re-store signals processed during alarms into said at least one exclusive memory device or into said portion of said memory storage device thereby retaining and protecting said signals processed during alarms from routine replacement by said freshly stored signals.

41. The method as set forth in claim 40, wherein said step of duplicating and re-storing said signals processed during alarms further extends the step of duplicating and re-storing processed signals to include signals processed prior to said triggering of said alarm and after said alarm has been cleared.

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42. The method as set forth in claim 40, and adapted for retrieving said routinely stored signals, the method further comprising the steps of:

retrieving said stored signals from said at least one main memory storage device and said at least one exclusive memory device on the basis of at least one of said registered identification code, said time and date of the routine processing of said stored signals and of said registered alarm code; and

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injecting signals corresponding to at least one of said identification code signals, signals corresponding to the time and date of said processing of said retrieved signals and said signals corresponding to said alarm code into said vertical blanking portion of said reprocessed video signals.

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43. The method as set forth in claim 34, adapted for simultaneous displaying a plurality of said retrieved and reprocessed video signals from said plurality of digital recorders through said playback receiver and further comprising the steps of;

outputting simultaneously a selected plurality of display signals by extracting from said retrieved and reprocessed video signals at least one of said injected time and dates and more than one of said injected identification codes.

- 5 44. The method as set forth in claim 42, adapted for simultaneous displaying a plurality of said retrieved and reprocessed video signals from said plurality of digital recorders through said playback receiver and further comprising the step of;

outputting simultaneously a selected plurality of display signals by extracting from said retrieved and reprocessed video signals at least one of said injected time and dates, more
10 than one of said injected identification codes and at least one of said injected alarm codes.

45. The method as set forth in claim 43, and further comprising the step of;
- applying at least one of the extracted identification code and said time and date for
superimposing upon command any of said identification code and said time and date onto a
15 display.

46. The method as set forth in claim 44, and further comprising the step of;
- applying at least one of the extracted identification code, said time and date and said alarm
code for superimposing upon command any of said identification code, said time and date

and said alarm code onto a display.

47. The method as set forth in claim 45, wherein said playback receiver further includes a directory memory for storing texts and names on the basis of said identification codes, and

5 the method further comprising the step of;

retrieving text and name from said directory memory on the basis of said identification code and superimposing upon command a selected said text, name and a combination thereof onto a display.

10 48. The method as set forth in claim 46, wherein said playback receiver further includes a directory memory for storing texts and names on the basis of said identification codes and the method further comprises the step of:

retrieving text and name from said directory memory on the basis of said identification code and superimposing upon command a selected said text, name and a combination thereof onto a display.

49. The method as set forth in claim 43, and further comprising the step of;

combining a plurality of said retrieved reprocessed signals on the basis of said time and date and on the basis of plurality of said identification codes for displaying on command a

split picture and multi-screen picture selected from the group consisting of picture in picture, quad picture, 9 split picture, 16 split picture and a combination thereof.

50. The method as set forth in claim 44, and further comprising the step of;

5 combining a plurality of said retrieved reprocessed signals on the basis of said time and date and on the basis of plurality of said identification codes for displaying on command a split picture and multi-screen picture selected from the group consisting of picture in picture, quad picture, 9 split picture, 16 split picture and a combination thereof.

10 51. An apparatus for synchronously recording and playing back a plurality of video signals, comprising:

a plurality of video cameras for generating video signals connected to plurality of digital video recorders via a plurality of first transmission lines;

15 said plurality of digital video recorders being connected to a playback receiver via playback control lines and a plurality of second transmission lines for propagating a selection of output video signals selected from said video signals, monitored video signals and playback video signals to said playback receiver and for propagating external synchronizing signals to said plurality of digital video recorders;

said playback receiver including an external synchronizing signal generator and said digital

video recorders include each an external sync receiving and transfer circuit for receiving said external synchronizing signal via said second transmission lines for synchronizing said digital video recorders and for transferring said external synchronizing signals to said video cameras through said first transmission lines, thereby synchronizing said television cameras to each other and to said video digital recorders;

each said video camera including a circuit for generating and mixing code signals corresponding to an identification code allotted to each said video camera into each said video signals fed to said digital video recorder;

said digital video recorder including control processing circuits for processing said recording, said playback and said selection of output video signals, time and date generating means for registering the time and dates of the processing of said recording, a decoding/encoding circuit for extracting said identification code from said video signals and for registering said identification code, and a compression/decompression circuit for compressing said video signals and decompressing said selection of output video signals, and at least one memory storage device for routine storing of said compressed signals on the basis of said registered time and dates of said processing in an endless rotation to capacity thereof, wherein freshly stored signals replace the oldest stored signals;

said decoding/encoding circuit generating and injecting signals corresponding to said registered identification code and signals corresponding to said time and date of said

processing into said selection of output video signals;

wherein said playback receiver includes control keys for generating recall commands for recalling said selection of output video signals from said plurality of digital video recorders and propagating said recall commands via said playback control lines, and wherein said recall commands are generated on the basis of said registry of said identification codes, selected from an individual identification code command, multiple identification codes command and said time and dates.

52. The apparatus for synchronously recording and playing back as set forth in claim 51, further comprising an alarm input for receiving an alarm signals for triggering alarm recording;

wherein said at least one memory storage device includes a storage portion that is excluded from said endless rotation for storing and retaining said processed video signals processed during alarms, thereby protecting said processed video signals processed during said alarms from routine replacement by said freshly stored signals.

53. The apparatus for synchronously recording and playing back video signals as set forth in claim 52, wherein said portion of said memory storage device is an exclusive memory storage device for storing said processed video signals processed during said alarms.

54. The apparatus for synchronously recording and playing back signals as set forth in claim 52, wherein said alarm signals are fed to said decoding/encoding circuit for generating alarm code signals and alarm codes corresponding to said alarm signals on the basis of said time and date of said alarms, for registering said alarm codes and for injecting said alarm code signals along with said identification code and said time and date signals into said selection of output video signals.

55. The apparatus for synchronously recording and playing back video signals as set forth in claim 53, wherein said routinely processed signals stored during said alarms are subjected to at least one of duplication and transfer into said at least one exclusive memory storage device.

56. The apparatus for synchronous recording and playing back video signals as set forth in claim 55, wherein said duplication and transfer of said routinely processed signals stored during said alarm into said at least one exclusive memory storage device includes signals processed prior to said triggering of said alarms and after said alarms has been cleared.

57. The apparatus for synchronously recording and playing back as set forth in claim 51,

wherein said at least one memory storage device includes a storage portion for storing and retaining a selected said stored signals that are excluded from said endless rotation, thereby retaining and protecting said selected stored signals from routine replacement by said freshly stored signals.

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58. The apparatus for synchronously recording and playing back video signals as set forth in claim 57, wherein said portion of said memory storage device is an exclusive memory storage device for storing said selected stored signals.

10 59. The apparatus for synchronously recording and playing back video signals as set forth in claim 58, wherein said selected stored signals are subjected to at least one of duplication and transfer to said at least one exclusive memory storage device.

15 60. The apparatus for synchronously recording and playing back video signals as set forth in claim 51, wherein said external synchronizing signal generator is connected to said plurality of second transmission lines for generating a pulse signal having a voltage level higher than a maximum voltage level or lower than a minimum voltage level of said video signal; and

each said video camera and each said digital video recorder includes a comparator circuit

means for separating said pulse signal transmitted over said transmission lines from said video signals by comparing said video signals to a reference signal having a predetermined voltage level, and applying said separated pulse signal to said video cameras and to said digital video recorders, wherein said transfer circuit is connected to said first transmission lines for transferring said separated pulse signal to said video cameras.

61. The apparatus for synchronously recording and playing back video signals as set forth in claim 60, wherein said pulse signal is opposite in polarity to an internal synchronizing signal which is contained in each of said video signals.

62. The apparatus for synchronously recording and playing back video signals as set forth in claim 51, wherein said external synchronizing signal generator circuit means generates an external synchronizing signal selected from the group consisting of a horizontal and vertical drive signal, a vertical drive signal, composite signal, and horizontal and vertical signal for propagation over said transmission lines.

63. The apparatus for synchronously recording and playing back as set forth in claim 54, wherein said control keys generate recall commands on the basis of said registry of said identification codes and said registry of said alarm codes, selected from an individual

identification code command, multiple identification codes command and said time and dates.

64. The apparatus for synchronously recording and playing back as set forth in claim 51,
5 adapted for simultaneous displaying a plurality of said selection of output video signals from said plurality of digital recorders through said playback receiver, wherein said playback receiver outputs simultaneously a selected plurality of display signals by extracting from said selection of output video signals at least one of said injected time and dates and more than one of said injected identification codes.

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65. The apparatus for synchronously recording and playing back as set forth in claim 63, adapted for simultaneous displaying a plurality of said selection of output video signals from said plurality of digital recorders through said playback receiver, wherein said playback receiver outputs simultaneously a selected plurality of display signals by
15 extracting from said selection of output video signals at least one of said injected time and dates, more than one of said injected identification codes and at least one of said injected alarm codes.

66. The apparatus for synchronously recording and playing back as set forth in claim 64,

wherein said decoding/encoding circuit extracts at least one of said identification code and said time and dates, and superimpose upon command any of said identification codes and said time and date onto a display.

5 67. The apparatus for synchronously recording and playing back as set forth in claim 65, wherein said decoding/encoding circuit extracts at least one of said identification code, said time and dates and said alarm code, and superimposes upon command any of said identification codes, said time and date and said alarm code onto a display.

10 68. The apparatus for synchronously recording and playing back as set forth in claim 66, wherein said playback receiver further includes a directory memory for storing texts and names on the basis of said identification codes and wherein an on screen display circuit of said playback receiver retrieves text and name from said directory memory on the basis of said extracted identification code and superimpose upon command said selected text, name
15 and a combination thereof onto said display.

69. The apparatus for synchronously recording and playing back as set forth in claim 67, wherein said playback receiver further includes a directory memory for storing texts and names on the basis of said identification codes and wherein an on screen display circuit of

said playback receiver retrieves text and name from said directory memory on the basis of
said extracted identification code and superimposes upon command said selected text,
name and a combination thereof onto said display.

5 70. The apparatus for synchronously recording and playing back as set forth in claim 64,
wherein said playback receiver combines a plurality of said selected of output video
signals on the basis of said time and dates and on the basis of plurality of said
identification codes and displays on command a split picture and multi-screen picture
selected from the group consisting of picture in picture, quad picture, 9 split picture, 16
10 split picture and a combination thereof.

71. The apparatus for synchronously recording and playing back as set forth in claim 65,
wherein said playback receiver combines a plurality of said selection of output video
signals on the basis of said time and dates and on the basis of plurality of said
15 identification codes and displays on command a split picture and multi-screen picture
selected from the group consisting of picture in picture, quad picture, 9 split picture, 16
split picture and a combination thereof.

72. An apparatus for time base corrected recording and synchronous playing back a plurality

of video signals, comprising:

plurality of video cameras for generating video signals connected to a plurality of digital video recorders via plurality of first transmission lines;

said plurality of digital video recorders being connected to playback receiver via playback

5 control lines and a plurality of second transmission lines for propagating a selection of output video signals selected from said video signals, monitored video signals and playback video signals to said playback receiver and for propagating external synchronizing signals to said plurality of digital video recorders;

said playback receiver including an external synchronizing signal generator and said digital

10 video recorders include an external sync receiving circuit for receiving said external synchronizing signal via said second transmission lines for synchronizing processing circuits and time base correcting circuits of said digital video recorders;

each said digital video recorder including control processing circuits for processing said recording, said playback and said selection of output video signals, time and date

15 generating means for registering the time and dates of the processing of said recording, an encoding circuit for generating an identification code allotted to each said video signals fed to said digital video recorder and for registering said identification code, a compression/decompression circuit for compressing said video signals and decompressing said selection of output video signals, and at least one memory storage device for routine

storing of said compressed signals on the basis of said registered time and dates of said processing in an endless rotation to capacity thereof, wherein freshly stored signals replace the oldest stored signals;

said encoding circuit generating and injecting signals corresponding to said registered
5 identification code and signals corresponding to said time and date of said processing into said selection of output video signals;

wherein said playback receiver includes control keys for generating recall commands for recalling said selection of output video signals from said plurality of digital video recorders and propagating said recall commands via said playback control lines and wherein said
10 recall commands are generated on the basis of said registry of said identification codes, selected from an individual identification code command, multiple identification codes command and said time and dates.

73. The apparatus for time base corrected recording and synchronous playing back as set forth
15 in claim 72, and further comprising an alarm input for receiving an alarm signals for triggering alarm recording;

wherein said at least one memory storage device includes a storage portion that is excluded from said endless rotation for storing and retaining said processed video signals processed during alarms, thereby protecting said processed video signals processed during said

alarms from routine replacement by said freshly stored signals.

74. The apparatus for time base corrected recording and synchronous playing back video signals as set forth in claim 73, wherein said portion of said memory storage device is an
5 exclusive memory storage device for storing said processed video signals processed during said alarms.

75. The apparatus for time base corrected recording and synchronous playing back signals as set forth in claim 73, wherein said alarm signals are fed to said decoding/encoding circuit
10 for generating alarm code signals and alarm codes corresponding to said alarm signals on the basis of said time and date of said alarms, for registering said alarm codes and for injecting said alarm code signals along with said identification code and said time and date signals into said selection of output video signals.

15 76. The apparatus for time base corrected recording and synchronous playing back video signals as set forth in claim 74, wherein said routinely processed signals stored during said alarms are subjected to at least one of duplication and transfer into said at least one exclusive memory storage device.

77. The apparatus for time base corrected recording and synchronous playing back video signals as set forth in claim 76, wherein said duplication and transfer of said routinely processed signals stored during said alarm into said at least one exclusive memory storage device includes signals processed prior to said triggering of said alarms and after said
5 alarms have been cleared.

78. The apparatus for time base corrected recording and synchronous playing back as set forth in claim 72, wherein said at least one memory storage device includes a storage portion for storing and retaining a selected said stored signals that are excluded from said endless
10 rotation, thereby retaining and protecting said selected stored signals from routine replacement by said freshly stored signals.

79. The apparatus for time base corrected recording and synchronous playing back video signals as set forth in claim 78, wherein said portion of said memory storage device is an
15 exclusive memory storage device for storing said selected stored signals.

80. The apparatus for time base corrected recording and synchronous playing back video signals as set forth in claim 79, wherein said selected stored signals are subjected to at least one of duplication and transfer to said at least one exclusive memory storage device.

81. The apparatus for time base corrected recording and synchronous playing back video signals as set forth in claim 72, wherein said external synchronizing signal generator is connected to said plurality of second transmission lines for generating a pulse signal having a voltage level higher than a maximum voltage level or lower than a minimum voltage level of said video signal; and

each said digital video recorder includes a comparator circuit means for separating said pulse signal transmitted over said transmission lines from said video signals by comparing said video signals to a reference signal having a predetermined voltage level, and applying said separated pulse signal to said digital video recorders.

82. The apparatus for time base corrected recording and synchronous playing back video signals as set forth in claim 81, wherein said pulse signal is opposite in polarity to an internal synchronizing signal which is contained in each of said video signals.

83. The apparatus for time base corrected recording and synchronous playing back video signals as set forth in claim 72, wherein said external synchronizing signal generator circuit means generates an external synchronizing signal selected from the group consisting of a horizontal and vertical drive signal, a vertical drive signal, composite signal, and horizontal

and vertical signal for propagation over said transmission lines.

84. The apparatus for time base corrected recording and synchronous playing back as set forth in claim 75, wherein said control keys generate recall commands on the basis of said registry of said identification codes and said registry of said alarm codes, selected from an individual identification code command, multiple identification codes command and said time and dates.

85. The apparatus for time base corrected recording and synchronous playing back as set forth in claim 72, adapted for simultaneous displaying a plurality of said selection of output video signals from said plurality of digital recorders through said playback receiver, wherein said playback receiver outputs simultaneously a selected plurality of display signals by extracting from said selection of output video signals at least one of said injected time and dates and more than one of said injected identification codes.

86. The apparatus for time base corrected recording and synchronous playing back as set forth in claim 84, adapted for simultaneous displaying a plurality of said selection of output video signals from said plurality of digital recorders through said playback receiver, wherein said playback receiver outputs simultaneously a selected plurality of display

signals by extracting from said selection of output video signals at least one of said injected time and dates, more than one of said injected identification codes and at least one of said injected alarm codes.

5 87. The apparatus for time base corrected recording and synchronous playing back as set forth in claim 85, wherein said decoding/encoding circuit extracts at least one of said identification code and said time and dates, and superimpose upon command any of said identification codes and said time and date onto a display.

10 88. The apparatus for time base corrected recording and synchronous playing back as set forth in claim 86, wherein said decoding/encoding circuit extracts at least one of said identification code, said time and dates and said alarm code, and superimpose upon command any of said identification codes, said time and date and said alarm code onto a display.

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89. The apparatus for time base corrected recording and synchronous playing back as set forth in claim 87, wherein said playback receiver further includes a directory memory for storing texts and names on the basis of said identification codes and wherein an on screen display circuit of said playback receiver retrieves text and name from said directory memory on the

basis of said extracted identification code and superimpose upon command a selected said text, name and a combination thereof onto said display.

90. The apparatus for time base corrected recording and synchronous playing back as set forth
5 in claim 88, wherein said playback receiver further includes a directory memory for storing texts and names on the basis of said identification codes and wherein an on screen display circuit of said playback receiver retrieves text and name from said directory memory on the basis of said extracted identification code and superimpose upon command said selected text, name and a combination thereof onto said display.

10

91. The apparatus for time base corrected recording and synchronous playing back as set forth
in claim 85, wherein said playback receiver combines a plurality of said selection of output video signals on the basis of said time and dates and on the basis of plurality of said identification codes and displays on command a split picture and multi-screen picture
15 selected from the group consisting of picture in picture, quad picture, 9 split picture, 16 split picture and a combination thereof.

92. The apparatus for time base corrected recording and synchronous playing back as set forth
in claim 86, wherein said playback receiver combines a plurality of said selection of output

video signals on the basis of said time and dates and on the basis of plurality of said identification codes and displays on command a split picture and multi-screen picture selected from the group consisting of picture in picture, quad picture, 9 split picture, 16 split picture and a combination thereof.

5

93. An apparatus for non-externally synchronized recording and synchronous playing back a plurality of video signals, comprising:

a plurality of video cameras for generating video signals connected to a plurality of digital video recorders via plurality of first transmission lines;

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said plurality of digital video recorders connected to a playback receiver via playback control lines and a plurality of second transmission lines for propagating a selection of output video signals selected from said video signals, monitored video signals and playback video signals to said playback receiver and for propagating external synchronizing signals to said plurality of digital video recorders;

15

said playback receiver including an external synchronizing signal generator and said digital video recorders include an external sync receiving circuit for receiving said external synchronizing signal via said second transmission lines for synchronizing processing circuits of said video digital recorders;

each said digital video recorder includes control processing circuits for processing said

recording, said playback and said selection of output video signals, time and date
generating means for registering the time and dates of the processing of said recording, an
encoding circuit for generating an identification code allotted to said video signals fed to
said digital video recorder and for registering said identification code, a
5 compression/decompression circuit for compressing said video signals and decompressing
said selection of output video signals, and at least one memory storage device for routine
storing of said compressed signals on the basis of said registered time and dates of said
processing in an endless rotation to capacity thereof, wherein freshly stored signals
replaces the oldest stored signals;

10 said encoding circuit generating and injecting signals corresponding to said registered
identification code and signals corresponding to said time and date of said processing into
said selection of output video signals;

wherein said playback receiver includes control keys for generating recall commands for
recalling said selection of output video signals from said plurality of digital video recorders

15 and propagating said recall commands via said playback control lines and wherein said
recall commands are generated on the basis of said registry of said identification codes,
selected from an individual identification code command, multiple identification codes
command and said time and dates.

94. The apparatus for non-externally synchronized recording and synchronous playing back as set forth in claim 93, further comprising an alarm input for receiving an alarm signals for triggering alarm recording;

wherein said at least one memory storage device includes a storage portion that is excluded from said endless rotation for storing and retaining said processed video signals processed during alarms, thereby protecting said processed video signals processed during said alarms from routine replacement by said freshly stored signals.

95. The apparatus for non-externally synchronized recording and synchronous playing back video signals as set forth in claim 94, wherein said portion of said memory storage device is an exclusive memory storage device for storing said processed video signals processed during said alarms.

96. The apparatus for non-externally synchronized recording and synchronous playing back signals as set forth in claim 94, wherein said alarm signals are fed to said decoding/encoding circuit for generating alarm code signals and alarm codes corresponding to said alarm signals on the basis of said time and date of said alarms, for registering said alarm codes and for injecting said alarm code signals along with said identification code and said time and date signals into said selection of output video

signals.

97. The apparatus for non-externally synchronized recording and synchronous playing back video signals as set forth in claim 95, wherein said routinely processed signals stored during said alarms are subjected to at least one of duplication and transfer into said at least one exclusive memory storage device.

98. The apparatus for non-externally synchronized recording and synchronous playing back video signals as set forth in claim 97, wherein said duplication and transfer of said routinely processed signals stored during said alarm into said at least one exclusive memory storage device includes signals processed prior to said triggering of said alarms and after said alarms have been cleared.

99. The apparatus for non-externally synchronized recording and synchronous playing back as set forth in claim 93, wherein said at least one memory storage device includes a storage portion for storing and retaining a selected said stored signals that are excluded from said endless rotation, thereby retaining and protecting said selected stored signals from routine replacement by said freshly stored signals.

100. The apparatus for non-externally synchronized recording and synchronous playing back video signals as set forth in claim 99, wherein said portion of said memory storage device is an exclusive memory storage device for storing said selected stored signals.

5 101. The apparatus for non-externally synchronized recording and synchronous playing back video signals as set forth in claim 100, wherein said selected stored signals are subjected to at least one of duplication and transfer to said at least one exclusive memory storage device.

10 102. The apparatus for non-externally synchronized recording and synchronous playing back video signals as set forth in claim 93, wherein said external synchronizing signal generator is connected to said second transmission lines for generating a pulse signal having a voltage level higher than a maximum voltage level or lower than a minimum voltage level of said video signal;

15 each said digital video recorder includes a comparator circuit means for separating said pulse signal transmitted over said transmission lines from said video signals by comparing said video signals to a reference signal having a predetermined voltage level, and applying said separated pulse signal to said digital video recorders.

103. The apparatus for non-externally synchronized recording and synchronous playing back video signals as set forth in claim 102, wherein said pulse signal is opposite in polarity to an internal synchronizing signal which is contained in each of said video signals.

5 104. The apparatus for non-externally synchronized recording and synchronous playing back video signals as set forth in claim 93, wherein said external synchronizing signal generator circuit means generates an external synchronizing signal selected from the group consisting of a horizontal and vertical drive signal, a vertical drive signal, composite signal, and horizontal and vertical signal for propagation over said transmission lines.

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105. The apparatus for non-externally synchronized recording and synchronous playing back as set forth in claim 96, wherein said control keys generate recall commands on the basis of said registry of said identification codes and said registry of said alarm codes, selected from an individual identification code command, multiple identification codes command and said time and dates.

15

106. The apparatus for non-externally synchronized recording and synchronous playing back as set forth in claim 93, adapted for simultaneous displaying a plurality of said selection of output video signals from said plurality of digital recorders through said playback receiver,

wherein said playback receiver outputs simultaneously a selected plurality of display signals by extracting from said selection of output video signals at least one of said injected time and dates and more than one of said injected identification codes.

5 107. The apparatus for non-externally synchronized recording and synchronous playing back as set forth in claim 105, adapted for simultaneous displaying a plurality of said selection of output video signals from said plurality of digital recorders through said playback receiver, wherein said playback receiver outputs simultaneously a selected plurality of display signals by extracting from said selection of output video signals at least one of said
10 injected time and dates, more than one of said injected identification codes and at least one of said injected alarm codes.

108. The apparatus for non-externally synchronized recording and synchronous playing back as set forth in claim 106, wherein said decoding/encoding circuit extracts at least one of said
15 identification code and said time and dates, and superimpose upon command any of said identification codes and said time and date onto a display.

109. The apparatus for non-externally synchronized recording and synchronous playing back as set forth in claim 107, wherein said decoding/encoding circuit extracts at least one of said

identification code, said time and dates and said alarm code, and superimpose upon command any of said identification codes, said time and date and said alarm code onto a display.

5 110. The apparatus for non-externally synchronized recording and synchronous playing back as set forth in claim 108, wherein said playback receiver further includes a directory memory for storing texts and names on the basis of said identification codes and wherein an on screen display circuit of said playback receiver retrieves text and name from said directory memory on the basis of said extracted identification code and superimpose upon command
10 a selected said text, name and a combination thereof onto said display.

111. The apparatus for non-externally synchronized recording and synchronous playing back as set forth in claim 109, wherein said playback receiver further includes a directory memory for storing texts and names on the basis of said identification codes and wherein an on
15 screen display circuit of said playback receiver retrieves text and name from said directory memory on the basis of said extracted identification code and superimpose upon command a selected said text, name and a combination thereof onto said display.

112. The apparatus for non-externally synchronized recording and synchronous playing back as

set forth in claim 106, wherein said playback receiver combines a plurality of said selection of output video signals on the basis of said time and dates and on the basis of plurality of said identification codes and displays on command a split picture and multi-screen picture selected from the group consisting of picture in picture, quad picture, 9 split picture, 16 split picture and a combination thereof.

113. The apparatus for non-externally synchronized recording and synchronous playing back as set forth in claim 107, wherein said playback receiver combines a plurality of said selection of output video signals on the basis of said time and dates and on the basis of plurality of said identification codes and displays on command a split picture and multi-screen picture selected from the group consisting of picture in picture, quad picture, 9 split picture, 16 split picture and a combination thereof.